Letter to the Editor

THE ULTRAVIOLET ABSORPTION SPECTRUM OF META-FLUOROCHLOROBENZENE

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(*Received for publication, January 24, 1956*)

In continuation of the work on the ortho-fluoro-chlorobenzene (author, 1955), the ultraviolet absorption spectrum of meta-fluorochlorobenzene in the vapour state was studied, the only previous investigation on the absorption of this molecule being in hexane solution by Conrod-Billroth (1936). The spectrum was photographed with path lengths 15, 50 and 75 cms and at different temperatures ranging from $-80°C$ to about $+100°C$.

Two regions of absorption were observed :

(1) a continuous one below 2150 Å and (2) a discrete one in the region 2850–2350 Å. These two regions merge together at higher vapour pressures. The bands in the discrete region are red degraded and about 200 of them were measured. This system could be interpreted as due to the electronic transition A'–A'. In accordance with this a strong 0,0 band and progressions and combinations of many totally symmetrical vibrations were observed. The strong band at 37026.5 cm^{-1} was chosen as the 0,0 band of the system. Most of the bands were interpreted in terms of five upper state and four lower state frequencies. These, together with other data, are presented in Table 1.

TABLE I

Ground and excited state frequencies of m-$C_6H_4F.Cl$

Raman data (Kohlrausch, 1935)		U.V. absorption data		Tentative assignment
	Int.	Ground state	Excited state	
683	7	688	636 (st)	C-Cl stretching
880	2	895	846 (m)	
1002	10	1007	966 (vst)	Carbon ring breathing
1060	4	..	1023 (s)	
1217	4	1229	1218 (ms)	C-F stretching

On the red side of each of the strong bands, satellite bands were observed with frequency separations of 42 and 78 cm^{-1}, the latter being more pronounced. These bands were interpreted as the v–v transitions of some of the low lying vibrations. All strong bands also exhibit a double-headed structure with a separation of 6 cm^{-1}. These double heads are most probably rotational fine structure. A portion of the spectrum is reproduced in figure 1.

A detailed discussion of the analysis will be published shortly.

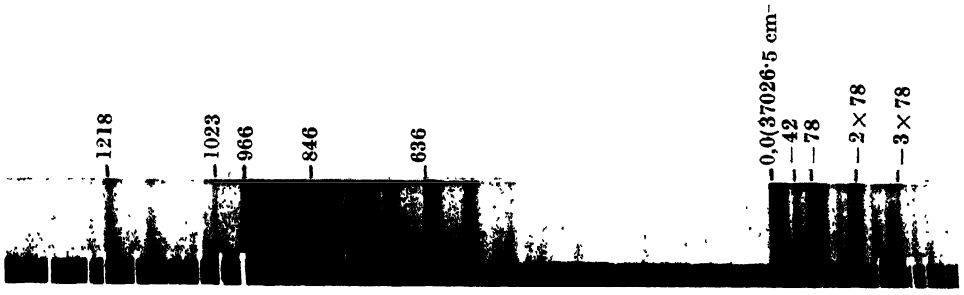

Fig. 1. Part of the U.V. absorption spectrum of *m*-fluorochlorobenzene

ACKNOWLEDGMENTS

The author is grateful to Dr. G. C. Finger of the Illinois State Geological Survey for the gift of the sample and to the Govt. of India for the award of a senior research scholarship. The author is deeply indebted to Prof. K. R. Rao for his valuable guidance.

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